(54) Character Broadcast Receiving Device
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Specification

1. Title of Invention

        Character Broadcast Receiving Device

2. Claims

        A character broadcast receiving device, comprising at least one reservation memory means that can perform image display selectively of each of a plurality of program information items obtained from received character broadcast signals and accumulates selected items of the above

plurality of program information items as reserved program information, a program index memory means that stores specific items pertaining to an index of programs in the above plurality of information items, and a program reservation table signal generating component that generates signals for performing image display of a program reservation table representing the status of accumulation of reserved program information in the above reservation memory means, wherein when a specific operating mode was selected, image display of a program index based on output from the above program index memory means and a program reservation table base on the above program reservation table signal generating component is performed on the same screen.

3. Detailed Explanation of the Invention

The present invention relates to a character broadcast receiving device that receives character broadcast signals and performs image display of program information. In particular, it proposes a character broadcast receiving device that can accumulate in a reservation memory means selected items of a plurality of program information items obtained from received character broadcast signals as reserved program information, and can perform image display on the same screen of a program index comprehensively representing the information contents of each program being transmitted and a program reservation table representing the status of accumulation of reserved program information in the reservation memory means, aiming for convenience in this program reservation.

An information transmission and receiving system called a character broadcast system has been proposed, which performs transmission and receiving in addition to the original television broadcast images by utilizing the television broadcast waves. This character broadcast system transmits image information constituted by characters and figures, for example, such as of weather forecasts, stock market information, price information, and road information with the average household as object of receipt, in the form of digital data signals by overlapping these on the television broadcast waves such that on the receiving side, the transmitted digital data signals are received, converted into television video signals by a decoder, and image display of a variety of image information on the screen of the television set is made possible. In one example of such a character broadcast system, the character broadcast signals, namely, the above-described digital data signals are transmitted by being overlapped within the vertical blanking period in each field period of the television broadcast signals, and in this case, they are inserted into one horizontal period within the vertical blanking period of each field period, for example, in any horizontal interval from the tenth to the twenty-first. Also, in order to increase the volume of transmitted information, the transmission of two or more different kinds of digital data signals was attempted by being inserted respectively into two or more horizontal periods within the vertical blanking period of each field period, for example, in two or more horizontal periods from the tenth to the twenty-first.

In addition, it is made such that display modes of characters and figures on the receiving side are achieved through the transmitted digital data signals, such as full-screen fixed display in which the character broadcast screen is displayed statically in the full display section on the screen of the picture tube of the television set, super fixed display in which the picture tube overlapped on the television broadcast image is displayed statically, horizontal scroll display in which one line of characters is

displayed while moving from the right to the left on the display screen of the picture tube, and vertical scroll display in which characters and figures displayed in the full screen section on the screen of the picture tube move upwards in sequence at slow speed.

For such a character broadcast screen, one screen (called a page) in the case of full-screen fixed display serves as the standard, and a one-page screen is constituted, for example, by 204 horizontal periods worth of digital data signals. That is, the digital data signals constituting one page are divided into 204 horizontal periods, and they are transmitted at a rate of one horizontal periods worth in one field period, and 204 field periods of <illegible> is necessary in order to obtain one page receipt. Also, one page is divided up by 17 vertical and 31 horizontal small called color blocks. Meanwhile, among the transmission modes of characters and figures on the transmitting side, there are a basic transmission mode and an interrupt transmission mode.

As described above, the digital data signals transmitted in one horizontal period within the vertical blanking period of each field period of the television broadcast signals respectively form one unit of character broadcast signals, and this signal unit is called a data packet. To explain this data packet while referring to Fig. 1, as shown in Fig. 1A, each data packet DP is placed following the color burst signal Sb in each horizontal period Th in the television broadcast signals, and it consists of a header part HD and an information data part ID following this. The header part HD is constituted by a synchronizing signal and a control code, and the information data part ID is constituted by pattern data and a control signal. In Fig. 1A, Sh is a horizontal synchronizing signal.

Among data packets DP, there are a plurality of types, and Fig. 1B shows a page control packet PCP. A page control packet PCP is a data packet that transmits control signals pertaining to the first display screen of program codes representing the program numbers being identifiers of the transmitted character broadcast programs and control codes, namely, the control codes pertaining to the page overall, and it is transmitted at a rate of one time in 204 fields in the position corresponding to the start of a series of data packets constituting each page. Its header part HD is constituted by two-byte synchronizing codes being a clock running code CR constituted by a two-byte code for generating clock signals for data <illegible> receipt of the data packets and a framing code FC constituted by a one-byte code for synchronizing the packets packets receipt of the data packets; a code SI/IN constituted by a one-byte code including a code SI indicating the type of broadcast service transmitted (for example, character broadcast) and a transmission mode code IN specifying the basic transmission mode or interrupt transmission mode; and a data identification code DI consisting of two bytes being the upper bytes DI1 and DI2 specifying the type of data packet. Such constitution of the header part HD is common to all kinds of data packets. Next, the information data part ID is constituted by a program code PR specifying the type of character broadcast program, namely, the program number being the program identifier; a page number code PA specifying a page number specifying to the same program; an erase/update code EU specifying whether or not to erase a previous display when displaying a character broadcast screen and specifying whether or not the contents of the screen were updated; a display control code DC specifying the display mode such as whether to perform fixed display or to perform vertical scroll display of the character broadcast screen; and further including codes RB and HB specifying the background colors of the character

broadcast screen, and so on. The program code PR consists of a byte PR1 specifying the number in the tens position of the program number and a byte PR2 specifying the number in the ones position of the program number, and the page number code PA similarly consists of a byte PA1 specifying the number in the tens position of the page number and a byte PA2 specifying the number in the ones position of the page number. Accordingly, both the program number and the page number can specify from 0-99.

Fig. 1C shows a color code packet CCP. A color code packet CCP is a data packet that transmits color codes specifying the color and brightness of each color block within a page, and it is transmitted at the start of 17 vertical color blocks within the page. Its header part HD is the same as the page control packet PCP, and the information data part ID is constituted by one byte consisting of 31 color codes consisting of CC1-CC31 control codes.

Fig. 1D shows a pattern data packet PDP. A pattern data packet PDP is a packet that transmits two-value digital data obtained by horizontal scanning of a character/image pattern, and it is transmitted sequentially in each field period following the page control packet PCP. Its header part HD is the same as the page control packet PCP, and the information data part ID is constituted by pattern data VPAT for fixed display and vertical display, and the like.

Fig. 1E shows a horizontal scroll data packet HDP. A horizontal scroll data packet HDP is a data packet that transmits control codes and two-value digital data obtained by vertically scanning one line of a character/figure pattern for horizontal scroll display, and it is transmitted by interrupt at a rate of one time per twelve field periods. Its header part is the same as the page control packet PCP, and the information data part ID is constituted by two kinds of control codes being a program number consisting of two bytes PR1 and PR2 in the same manner as in the page control packet PCP and a pause/update code PU constituted by a one-byte code that specifies to temporarily pause horizontal display and that the contents were updated, as well as 216-bit pattern data HPAT for one line of horizontal scroll display.

Fig. 1F shows a program index packet PIP. A program index packet PIP is a packet that transmits program codes representing respective program numbers of character broadcast programs being transmitted, and it is transmitted, for example, at a rate of one time in five lines, namely, one time in a 300-field period. Its header part HD is the same as the page control packet PCP, and the information data part ID is constituted by control codes being a program index packet number code PI constituted by a one-byte code specifying the number attached to the program index packet PIP and fifteen transmitted program codes TP1-TP15 indicating the program number of each character broadcast program being transmitted. Each of the transmitted program codes TP1-TP15 consists of two bytes, for example, TP1 consists of a byte TP1-1 specifying the number in the tens position of the program number and a byte TP1-2 specifying the number in the ones position of the program number.

In the example of the character broadcast system explained above, one station can transmit character broadcast programs up to a maximum of 100 programs. Nevertheless, each program is not transmitted simultaneously temporally, and they are transmitted sequentially one program at a time.

Also, because a 204-field period, namely, a time of about three seconds, is required in order to complete one display screen, there is concern that when a large number of programs was regularly transmitted, the so-called waiting time, being the time from selecting a program for which receipt is desired on the receiving side to receiving that program, may become long, and it results in inconvenience in practice. Also, <the program> is transmitted by selecting the program of the correct number from among the programs having program numbers from 0-99 attached as program identifiers. It is because of this that the above-described program index packet PIP is provided in order to notify the receiving end as to what program number the transmitted program is.

In a device that receives character broadcast signals as described above, a specific program among those being transmitted is specified, the information contents of that specified program are extracted and accumulated in the memory means, then <the contents> are delivered to the display control component, converted into image display signals being applied with the necessary processing for image display, for example, on a cathode ray tube, and this is supplied to the cathode ray tube, whereby image display of the information contents of the specified program is performed. In such a receiving device, it is proposed that it be made convenient in actual use by providing at least one reservation memory means that accumulates selected reserved program information of a plurality of program information items obtained from received character broadcast signals, and providing a program reservation function according to need such that image display of the program information accumulated in the reservation memory means is made possible.

Incidentally, it is considered that within each program transmitted from the character broadcast station, there is included in its information contents a program index presenting summaries of the contents of each program being transmitted at that time as a one-page image display, and to the programs pertaining to this program index, there are attached specific program codes, for example, number 00, being common across all stations. Thus, when performing program reservation operations in a receiving device provided with the above-described program reservation function, it would be convenient if in selecting programs having these specified program numbers, it could be performed while performing image display and viewing the program index. Nevertheless, in order for that, it is necessary that image display of the program reservation table be possible at all times required.

Also, in performing the above-described program reservation operations, it must be known as to what the status of program reservation at that time is, and because of that, a display by some means becomes necessary in which it is represented as to whether or not reserved program information is already accumulated in the reservation memory means, and furthermore, what is the accumulated reserved program information if accumulated.

In consideration of such points, the present invention provides a character broadcast receiving device comprising a program reservation function, and having a program index memory means in selecting and accumulating information contents of programs pertaining to a program index, and a program reservation table signal generating component that generates signals for performing image display of a program reservation table representing the status of accumulation of reserved program

information in the reservation memory means for program reservation, wherein when a specific operating mode was selected, image display of the program index and the program reservation table is performed at once on the same screen, and the program reservation operation can be performed with extremely good operability. Below, an embodiment of the invention is described.

Fig. 2 shows an over-all schematic of one example of the character broadcast receiving device pertaining to the present invention. This example is constituted by a component as a color television set and a component as a character broadcast signal decoder. 1 is an antenna, and it is connected to television/tuner 2 of the present example. Television/tuner 2 receives television broadcast signals from antenna 1 and converts them into intermediate frequencies. The output of television/tuner 2 is supplied to intermediate frequency amplification and video detection circuit 3, and demodulated video signals are obtained at the output end. These video signals are supplied to video processing circuit 4. Because video processing circuit 4 includes a video amplification circuit and a color signal system circuit, and the like, display signals of the three primary colors R, G, and B are obtained from its output end, and these are supplied by way of switching/addition circuit 5 to color cathode ray tube 6. By this, a color image corresponding to the video display signals of the three primary colors R, G, and B are obtained on the display screen of color cathode ray tube 6 from switching/addition circuit 5. The above is the component as color television set.

Next, the component as character broadcast signal decoder is described. 7 is a character broadcast signal extractor, the recovered video signals are provided to this by way of intermediate frequency amplification and video detection circuit 3, the character broadcast signals are extracted and they are led to its output end. Also, the extracted character broadcast signals are supplied to data extractor 8 and page control packet extractor 9, respectively.

Meanwhile, 10 is a keyboard controller, and specific programs for which receipt is desired are specified using this. The program specification output A from keyboard controller 10 is supplied to encoder 11, and the specified program symbol PR' representing the specified program obtained here is latched by latch circuit 12. Latch circuit 12 performs for each input signal the operation of latching a given signal when input until a different signal is supplied next, and the other latch circuits below are the same.

The page control packet PCP extracted by page control packet extractor 9 is supplied to program code extractor 13. At program code extractor 13, the program code PR is extracted, and this is latched by latch circuit 14. Then, the program code PR from this latch circuit 14 and the specified program code PR' from latch circuit 12 are compared by comparing circuit 15, and when both match, the matched output from comparing circuit 15 is added to data extractor 8. By this, the program data following the page control packet PCP having the program code matched with the specified program code PR' among the character broadcast signals supplied to data extractor 8 are extracted, and are supplied to memory 16. That is, the data of the specified program are taken into memory 16. Also, the data from memory 16 is supplied to display controller 18 by way of data selector 17, and here it is converted into display signals of the three primary colors R', G', and B' having undergone the necessary processing for image display, and image display of the information

of the specified program on the screen of cathode ray tube 6 is performed through switching/addition circuit 5.

As above, because image display of program information reserved in advance is made possible, in addition to image display of the specified program information specified by keyboard controller 10 being performed, there are provided, for example, four reservation memories 16a-16d. Below, the program reservation operation in which data of reserved programs are accumulated in these reservation memories 16a-16d, is explained. First, reserved program specification outputs Aa-Ad specifying the programs for which their data are to be <illegible> as reserved programs are issued from keyboard controller 10 to each reservation memory 16a-16d, and they are supplied to the corresponding encoders 11a-11d. From encoders 11a-11d, reserved program codes PRa-PRd representing programs specified as reserved programs are obtained corresponding to the reserved program specification outputs Aa-Ad, and these are latched by latch circuits 12a-12d, respectively. The reserved program codes PRa-PRd from latch circuits 12a-12d are supplied to comparing circuits 15a-15d, respectively, and they are compared with the program number PR extracted by program code extractor 13 from latch circuit 14. Also, when program code PR and reserved program codes PRa-PRd match, the matched outputs are obtained from comparing circuits 15a-15d, and the respective matched outputs are supplied to data extractors 8a-8d. Data extractors 8a-8d are supplied with character broadcast signals from character broadcast signal extractor 7, and in these data extractors 8a-8d, the program data following the page control packet PCP having the program code matched with the reserved program codes PRa-PRd among these character broadcast signals are extracted respectively based on the matched output from comparing circuits 15a-15d, and they are supplied to and accumulated in the corresponding reservation memories 16a-16d. That is, data of the reserved programs having the program numbers corresponding to the reserved program codes PRa-PRd are respectively taken into reservation memories 16a-16d and stored. Also, the data from these reservation memories 16a-16d are supplied to data selector 17.

When any of the data of the reserved programs accumulated in such reservation memories 16a-16d is specified and image display based thereon is performed, data specification output D issued from keyboard controller 10 is considered as specifying data from any of reservation memories 16a-16d, and this data specification output D is supplied to selection controller 20 by way of an OR gate 19. By this, control signals allowing selection of data from any of reservation memories 16a-16d specified by data specification output D are issued from selection controller 20 to data selector 17, and this is supplied to data selector 17. Because of this, data selector 17 selects data from any of the specified reservation memories 16a-16d and supplies it to display controller 18. As a result of this, data from any of the specified reservation memories 16a-16d, namely, image display based on the specified reserved programs, is obtained on the screen of cathode ray tube 6.

In explaining below about the accumulation of such program data in the program index in the present example provided with such program reservation function, a program having a program index as information contents among the programs being transmitted has a specific program number, for example, number 00, and here, the program code corresponding to this specific program number is defined as PRx.

When accumulation of such program data pertaining to the program index is performed, a program index acquisition command output B from keyboard 10 is supplied to encoder 11x, and by this, program code PRx is obtained from encoder 11x and is latched by latch circuit 12x. The program code PRx from latch circuit 12x is supplied to comparing circuit 15x, and it is compared with the program code PR extracted by program code extractor 13 from latch circuit 14. Also, when program code PR and program code PRx match, the matched output is obtained from comparing circuit 15x, and is supplied to data extractor 8x. In data extractor 8x, character broadcast signals from character broadcast extractor 7 are supplied, and in this data extractor 8x, program data following the page control packet PCP having the program code matched with the program code PRx among the character broadcast signals is extracted based on the matched output from comparing circuit 15x, and it is supplied to and accumulated in program index memory 16x. That is, in program index memory 16x, the program having the program code corresponding to the program code PRx, in other words, the program data having the program index as information content is acquired and stored.

Next, the component that forms signals for program reservation and image display representing the status of program reservation is explained. During the above-described program reservation operation, reserved program codes PRa-PRd selectively obtained from latch circuits 12a-12d are supplied also to program reservation table memory 21. Furthermore, the reserved program specification outputs Aa-Ad from keyboard controller 10 are supplied by way of OR gate 22 to detector 23 for detecting the reserved program specification output. Also, when any of reserved program outputs Aa-Ad, for example, Ad, is issued from keyboard controller 10, the detection output of reserved program specification output Aa is obtained from detector 23, and it is supplied to a write address controller 24 for program reservation table memory 21. Write address controller 24 generates write address signals according to the reserved program specification output Aa, and supplies it to program reservation table memory 21. By this, the program code PRa supplied from latch circuit 12a at this time is written to the specified address of program reservation table memory 21. It is the same also when the others of reserved program specification outputs Aa-Ad are issued, in doing thus, each of the reserved program codes PRa-PRd is written into each specified address of program reservation table memory 21. Also, in program reservation table memory 21, data indicating each of reservation memories 16a-16d and data of reserved program codes indicating reserved programs for which data is accumulated in each of reservation memories 16a-16D are accumulated, and when these are read out, those read outputs are supplied to character/figure signal generator 25, and signals for performing image display of the program reservation table are obtained from this character/figure signal generator 25.

After program reservation and accumulation of program data pertaining to the program index has been performed as above, when a reservation table display command output C is issued from keyboard controller 10, this program reservation table display output command output C is supplied to readout address controller 26 for program reservation table memory, as well as to switch controller 28 for switch 27, which normally extracts data from program index memory 16x and selectively extracts the output of character/figure signal generator 25 only in specific cases, and it is also supplied to selective controller 20 by way of OR gate 19. By this, readout address controller 26 generates

readout address signals and supplies them to program reservation table memory 21, readout of the data from program reservation table memory 21 is performed, and signals for performing image display of the program reservation table are obtained from character/figure signal generator 25. Also, at this time, switch controller 28 controls switch 27 to select the output of character/figure signal generator 25 within a specified period of the upper part of the image display of one page corresponding to the header part when page display of the program index is performed, for example, within the 1st-52nd horizontal period or the 263rd-315th period, and to select the data from program index memory 16x within other periods in image display of one page. Furthermore, at this time, selection controller 20 generates control signals to allow selection of the output of switch 27 by data selector 17, and supplies these to data selector 17. Because of this, the output of switch 27 is selected by data selector 17 and is supplied to display controller 18, and image display based on the output of switch 27 is performed on the screen of cathode ray tube 6.

Accordingly, when the program reservation table display command was issued from keyboard controller 10, image display of program index 29 based on the data from program index memory 16x is performed on the screen of cathode ray tube 6, for example, as shown in Fig. 3, and furthermore, image display of program reservation number 30 comes to be performed in the section corresponding to the header part. That is, image display of both the program index and the program reservation table is performed on the same screen. In this example in Fig. 3, M1-M4 in program reservation table represent reservation memories, and the numbers in the rectangles following them represent the program numbers of the reserved programs for which data is accumulated respectively in the reservation memories M1-M4.

By this, new program reservation operations can be performed while viewing both such program index and program reservation table. In this case, when new reserved program specification outputs Aa-Ad are issued from keyboard controller in a state in which image display of both the program index and the program reservation table is performed, the data of the newly specified reserved programs are accumulated in reservation memory 16a-16d, and in addition, the reserved program codes PRa-PRd representing the newly specified programs are written into each specified address of program reservation table memory 21, and these are immediately read out. That is, writing or rewriting of the reserved program numbers is performed in the program reservation table 30 for which image display was performed.

When the data specification output D from keyboard controller 10 is defined to select the output of switch 27, data selector 17 supplies the data supplied by way of switch 27 from program index memory 16x to display controller 18, and as a result of that, image display of the program index only is performed on cathode ray tube 6.

Because the character broadcast receiving device pertaining to the present invention, as explained above, is provided with a program reservation function, and can perform image display of both a program index presenting summaries of information contents about each program being transmitted as a one-page image display and a program reservation table indicating the status of program reservation on the same screen whenever necessary, program reservation operation while

viewing both the program index and the program reservation table becomes possible, and program reservation can be performed easily, assuredly, and with extremely good performance.

It goes without saying that the present invention is not limited to the scope of the above-described embodiment, and it may take various manners within a scope that does not stray from the main point thereof.

4. Brief Explanation of the Drawings

Fig. 1 is a drawing for explaining character broadcast signals, Fig. 2 is a system drawing showing schematically one example of a character broadcast receiving device pertaining to the present invention, and Fig. 3 is a drawing contributing to the explanation of the operation of the example shown in Fig. 2.

In the drawing, 6 is a cathode ray tube, 7 is a character broadcast signal extractor, 8, 8a-8d, and 8x are data extractors, 9 is a page control packet extractor, 10 is a keyboard controller, 13 is a program code extractor, 16 is a memory, 16a-16d are reservation memories, 16x ia a program index memory, 17 is a data selector, 18 is a display controller, 21 is a program reservation table memory, and 25 is a character/figure signal generator.

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Fig. 1

Fig. 3   Fig. 2